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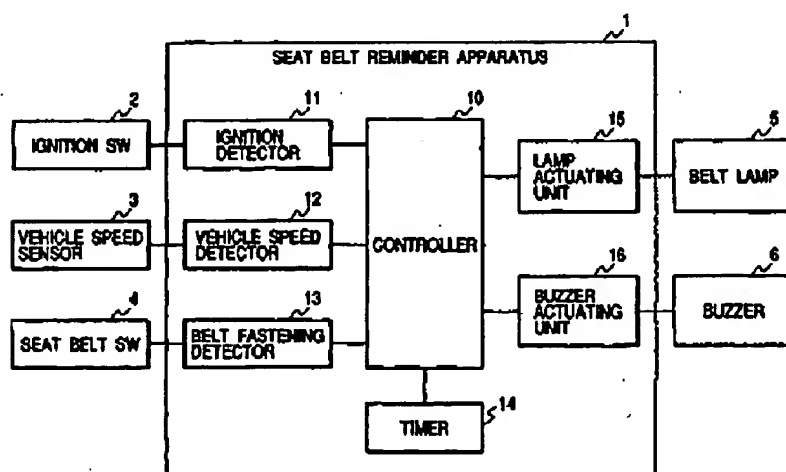
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(54) **Seat belt fastening reminder apparatus and the method thereof**

(57) A method for reminding a seat belt fastening, includes the steps of: providing an audible alarm unit and a visible alarm unit; detecting at least either one of a vehicle speed, a traveling distance or a time; setting a low alarm stage in which only the visible alarm unit is actuated after an engine start and a high alarm stage when at least the audible alarm unit is actuated; actuating at least one of the audible alarm unit and the visible

alarm unit in accordance with the alarm stages; changing the low alarm stage to the high alarm stage when a vehicle speed reaches a predetermined vehicle speed in the low alarm stage; and changing the high alarm stage to the low alarm stage only in a case that the seat belt is in a fastening state when the vehicle speed becomes less than the predetermined vehicle speed in the high alarm stage

**FIG. 1**



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## Description

[0001] The present invention relates to a method for reminding a seat belt fastening and a seat belt reminder apparatus in which an alarm is given for non-fastening of a seat belt of a vehicle by a warning lamp or a buzzer.

[0002] Recently, an apparatus called a seat belt reminder for giving an alarm for non-fastening of the seat belt by the lamp or the buzzer has been proposed. As shown in Fig. 7, this kind of the seat belt reminder apparatus detects a state of a seat belt switch when an ignition switch is on, and if the seat belt is in a unfastening state, the buzzer for warning and the lamp are actuated at timings shown by ON in the drawing. By this, the buzzer sound is emitted and the lamp is turned on, and the alarm for non-fastening of the belt is given.

[0003] Besides, in order to avoid unnecessary alarm like European vehicle evaluation standards, a seat belt reminder method and apparatus is also proposed in which not only the above state of the seat belt switch but also vehicle speed information is taken into consideration, plural stages such as a low alarm stage and a high alarm stage are provided, and more variety alarm output control corresponding to the respective stages is performed.

[0004] However, in such a seat belt reminder method and apparatus as mentioned above in which the plural stages are provided for the alarm, although the driving control of a buzzer and a lamp at the time when a transition occurs from the low alarm stage to the high alarm stage satisfies practicality, it can not be necessary that the driving control of the buzzer and the lamp at every time when the transition occurs from the high alarm stage to the low alarm stage satisfies the practicality.

[0005] For example, in the seat belt reminder method and apparatus in which the low alarm stage and the high alarm stage are fixed by a predetermined vehicle speed, and different alarms are outputted correspondingly to the respective stages, in the case of travelling at a speed in the vicinity of the vehicle speed as the reference, each time it exceeds or falls below the vehicle speed as the reference, a changeover between alarms corresponding to the low alarm stage and the high alarm stage is carried out, and it is expected that an uncomfortable feeling is given to a driver and other passengers. Especially, in the case where the buzzer is not used in the low alarm stage, and the buzzer is used in the high alarm stage, each time the stage is changed, an intermittent buzzer sound is outputted, and the uncomfortable feeling is given to the driver.

[0006] It is therefore an object of the present invention to provide a method for reminding a seat belt fastening and a seat belt reminder apparatus in which an alarm stage is divided into parts (or segments) with a vehicle speed as a reference, and different alarms are outputted correspondingly to respective stages, and an uncomfortable feeling due to an intermittent alarm sound is suppressed and practicability is improved.

[0007] In order to achieve the above object, the present invention provides a method for reminding a seat belt fastening, comprising the steps of:

providing an audible alarm unit and a visible alarm unit;  
detecting at least either one of a vehicle speedy a traveling distance or a time;  
setting a low alarm stage of the visible alarm unit after an engine start and a high alarm stage of the audible alarm unit;  
driving at least one of the audible alarm unit and the visible alarm unit in accordance with the alarm stage;  
changing the low alarm stage to the high alarm stage when a vehicle speed reaches a predetermined vehicle speed in the low alarm stage; and  
changing the high alarm stage to the low alarm stage only when the seat belt is in a fastening state when the vehicle speed becomes less than the predetermined vehicle speed in the high alarm stage.

[0008] In the above configuration, only the visible alarm unit is driven in the low alarm stage from the engine start to the previously determined predetermined vehicle speed, and the audible alarm unit is driven in the high alarm stage at the time when the vehicle speed reaches the predetermined vehicle speed in the low alarm stage so that the alarm is given for the unfastening of the seat belt at higher alarm level than that of the low alarm stage. Accordingly, since the audible alarm is not given at a belt fastening needless time, such as a halting time of the vehicle, an uncomfortable feeling is not given to a user. Besides, at the time of a low driving speed before the vehicle speed reaches the predetermined vehicle speed, the minimum alarm is given by only the visible alarm, and when it reaches the predetermined vehicle speed and a degree of a danger is increased, the alarm is certainly given by the audible alarm. Further, the transition from the high alarm stage to the low alarm stage is made to occur only in the case where the seat belt is in the fastening state in the high alarm stage and at the time when the vehicle speed becomes less than the predetermined vehicle speed, and when the seat belt is fastened in any of the low alarm stage and the high alarm stage, an actuation of both the audible alarm unit and the visible alarm unit is stopped. Accordingly, in the case of traveling at a speed in the vicinity of the predetermined vehicle speed, the occurrence of a situation is prevented in which each time it exceeds or falls below the vehicle speed, the alarm is changed to one corresponding to the low alarm stage or the high alarm stage, and the alarm in the high alarm stage becomes intermittent. As the result, according to the present invention, an uncomfortable feeling is not given to a driver, and a correct alarm corresponding to an exact situation can be certainly given.

[0009] Preferably, both the audible alarm unit and the

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visible alarm unit are driven (or actuated) in the high alarm stage.

[0010] In the above configuration, the alarm in the high alarm stage is given more certainly. As the result, according to the present invention, the uncomfortable feeling is not given to the driver, and the alarm corresponding to the situation can be more certainly given.

[0011] Here, it is preferable that, the audible alarm unit and the visible alarm unit are driven synchronously in the high alarm stage.

[0012] In the above configuration, the alarm in the high alarm stage is given more certainly. As the result, according to the present invention, the uncomfortable feeling is not given to the driver, and the alarm corresponding to the situation can be more certainly given.

[0013] Here, it is preferable that, the visible alarm unit is actuated in the low alarm stage. The high alarm stage includes a first high alarm stage and a second high alarm stage. The low alarm stage changes to the first high alarm stage in which the visible alarm unit is turned on and off at a first period when the vehicle speed exceeds the predetermined vehicle speed in the low alarm stage. The first high alarm stage changes to the second high alarm stage in which the visible alarm unit is turned on and off at a second period shorter than the first period when a predetermined time is passed.

[0014] In the above configuration, as the degree of the danger increases, the alarm is gradually enhanced, and the alarm can be certainly given without giving the uncomfortable feeling to the driver or the passenger.

[0015] Preferably, the visible alarm unit is a warning lamp, and the audible alarm unit is a buzzer.

[0016] According to the present invention, there is also provided a seat belt reminder apparatus, comprising:

an alarm information detector for detecting at least either one of an information of a vehicle speed, a traveled distance or an elapsed time;  
a setting unit for setting a plurality of alarm stages on the basis of the alarm information; and  
an alarm unit with an audible alarm unit and a visible alarm unit for driving at least one of the audible alarm unit or the visible alarm unit in accordance with the alarm stages;  
a unit for setting a low alarm stage where only the visible alarm unit is actuated after an engine start and a high alarm stage where at least the audible alarm unit is actuated;

wherein the low alarm stage changes to the high alarm stage when the vehicle speed reaches a predetermined vehicle speed in the low alarm stage; and

wherein the high alarm stage changes to the low alarm stage only when the seat belt is in a fastening state when the vehicle speed becomes less than the predetermined vehicle speed in the high alarm stage.

[0017] In the above configuration, only the visible alarm unit is actuated in the low alarm stage from the

engine start to the predetermined vehicle speed, and in the high alarm stage at the time when the vehicle speed reaches the predetermined vehicle speed in the low alarm stage, the audible alarm unit is actuated so that the alarm is given for the non-fastening of the seat belt at an alarm level higher than the low alarm stage. Accordingly, since the audible alarm is not given at the belt fastening needless time, such as the halting time of the vehicle, the uncomfortable feeling is not given to the user. Besides, the minimum alarm is given by only the visible alarm at a low speed driving condition before reaching the predetermined vehicle speed, and when the vehicle speed reaches the predetermined vehicle speed and the degree of the danger is increased, the alarm is certainly given by the audible alarm. Further, the transition from the high alarm stage to the low alarm stage is made to occur only in the case where the seat belt is in the fastening state at the time when the vehicle speed becomes less than the predetermined vehicle speed in the high alarm stage, and when the seat belt is fastened in any of the low alarm stage and the high alarm stage, actuations of both the audible alarm stage and the visible alarm stage is stopped. Accordingly, in the case of traveling at the speed in the vicinity of the predetermined vehicle speed, the occurrence of a situation is prevented in which each time it exceeds or falls below this vehicle speed, the alarm is changed to one corresponding to the low alarm stage or the high alarm stage, and the alarm in the high alarm stage becomes intermittent.

[0018] Preferably, the audible alarm unit and the visible alarm unit are actuated synchronously in the high alarm stage.

[0019] In the above configuration, since the audible alarm unit and the visible alarm unit are synchronized and are actuated, the alarm in the high alarm stage is given more certainly.

[0020] The above objects and advantages of the present invention will become understood by describing in detail preferred exemplary embodiments thereof with reference to the accompanying drawings, wherein:

Fig. 1 is a block diagram showing a basic structure of a seat belt reminder apparatus according to an embodiment of the present invention (and a peripheral part of this apparatus);

Fig. 2 is a timing chart showing basic stage transitions and alarm operations performed at respective alarm stages according to the embodiment of the present invention;

Fig. 3 is a state transition diagram for explaining the respective alarm stages and the state transitions between the respective stages according to the embodiment of the present invention;

Fig. 4 is the state transition diagram of an alarm operation in a first stage;

Fig. 5 is the state transition diagram of the alarm operation in a second stage.

Fig. 6 is the state transition diagram of the alarm

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operation at a third stage; and

Fig. 7 is a time chart showing an alarm operation of a related seat belt reminder according to a prior art.

[0021] Hereinafter, embodiments of the present invention will be described with reference to the drawings.

[0022] Fig. 1 is a block diagram showing a basic structure of a seat belt reminder apparatus according to an embodiment of the invention and a peripheral part of the apparatus. In Fig. 1, a seat belt reminder apparatus 1 is connected to an ignition switch 2, a vehicle speed sensor 3, a seat belt switch 4, a belt lamp 5 and a buzzer 6.

[0023] The seat belt reminder apparatus 1 includes a controller 10 made of a microcomputer, and drives the belt lamp 5 and the buzzer 6 on the basis of information supplied from the ignition switch 2, the vehicle speed sensor 3, and the seat belt switch 4, that is, on the basis of vehicle speed information at the time of unfastening of a seat belt to give an alarm for the unfastening of the seat belt. The seat belt reminder apparatus 1 includes, in addition to the controller 10, an ignition detector 11, a vehicle speed detector 12, a belt fastening detector 13, a timer 14, a lamp driving unit 15 and a buzzer driving unit 16. The ignition detector 11 receives an ignition ON or OFF signal from the ignition switch 2 and supplies thereof to the controller 10. The vehicle speed detector 12 receives a pulse signal corresponding to a vehicle speed from the vehicle speed sensor 3 and supplies thereof to the controller 10. Besides, the belt fastening detector 13 receives an electric signal indicating fastening or unfastening of the seat belt and supplies thereof to the controller 10. Although these detectors 11, 12 and 13 include interface circuits for converting the respective signals from the ignition switch 2, the vehicle sensor 3 and the seat belt switch 4 into voltages suitable for the controller 10 made of the microcomputer, these may be functionally incorporated in the controller 10.

[0024] The timer 14 provides a timer information for judging later-mentioned alarm stages, and includes at least a 90 second timer. The lamp driving unit 15 and the buzzer driving unit 16 include driving circuits for driving the belt lamp 5 and the buzzer 6 on the basis of instructions from the controller 10, respectively.

[0025] The ignition switch 2 is used for judging vehicle operating conditions, and when the switch is turned on, it is judged that the vehicle is in the operating condition. The vehicle speed sensor 3 detects a vehicle speed, and outputs a pulse signal with a period corresponding to the vehicle speed. The output becomes one of plural series of informations for judging the later-mentioned alarm stages. The seat belt switch 4 outputs the electric signal indicating the fastening or unfastening of the seat belt to the seat belt reminder apparatus 1 on the basis of whether or not for example, at least a buckle attached to the seat belt is coupled.

[0026] The belt lamp 5 and the buzzer 6 are controlled by the seat belt reminder apparatus 1, and gives an alarm for the unfastening of the seat belt to a driver and

others. The belt lamp 5 is incorporated in, for example, a combination meter, and the buzzer 6 is incorporated in the seat belt reminder apparatus 1, however, these may be provided at other places as long as the alarm can be recognized by the driver.

[0027] Incidentally, in the next description, the seat belt is sometimes simply called a belt, and the belt lamp 5 is sometimes simply called a lamp.

[0028] Next, alarm operations performed at the respective alarm stages set in the embodiment of the present invention will be described in brief with reference to Fig. 2. Fig. 2 is a time chart showing basic stage transitions and alarm operations performed in the respective alarm stages according to the embodiment of the present invention.

[0029] Incidentally, in Fig. 2, the uppermost time chart indicates whether the ignition switch 2 of Fig. 1 is in an ON state or an OFF state. The time chart lower than that indicates by the seat belt switch 4 whether or not the seat belt is in the fastening state or the unfastening state. Further, the time chart lower than that indicates a pulse waveform made of High and Low corresponding to the vehicle speed from the vehicle speed sensor 3 of Fig. 1. Besides, the time chart lower than the vehicle sensor 3 indicates ON, OFF of the buzzer 6 shown in Fig. 1, and further, the time chart lower than that indicates ON, OFF of the belt lamp 5 shown in Fig. 1.

[0030] As shown in Fig. 2, in this embodiment, the alarm stages are set to be three stages, that is, a first stage S1, a second stage S2 and a third stage S3.

[0031] The first stage S1 is, as indicated by point P0, from ON of the ignition switch 2 to, as indicated by point P24, a predetermined vehicle speed, for example, 24 km/h or higher. In this first stage S1, the buzzer 6 is OFF, and only the lamp 5 is turned ON and is lit. Incidentally, when the seat belt is fastened in this stage, similarly to the buzzer 6, the lamp 5 is also turned OFF.

[0032] In the first stage S1, for example, in the case where the vehicle speed becomes 24 km/h or higher, a transition occurs to the next second stage S2. In this second stage S2, the lamp 5 is turned on and off at a predetermined frequency, and the buzzer 6 is also activated in synchronization with the predetermined frequency. In details, as indicated by 11 in the drawing, a pattern is repeated in which the lamp 5 is repeatedly turned on and off at a high level of 0.2 second and a low level of 0.2 second only in a period T5 (for example, five seconds), and subsequently to this, the lamp 5 is continuously lit only in a period T1 (for example, one second). Further, the buzzer 6 is activated in synchronization with the period T5 and the period T1. That is, the buzzer 6 repeats the pattern of ON of the period T5 and OFF of the period T1. Incidentally, also in this stage, when the seat belt is fastened, both the lamp 5 and the buzzer 6 are turned OFF.

[0033] In the second stage S2, in the case where the sum total of the buzzer ON (the total time of the state where the buzzer 6 is ON) becomes a period T90 (for

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example, 90 seconds) or higher in the drawing, a transition occurs to the next third stage S3. In this third stage S3, similarly to the first stage S1, only the lamp 5 is lit, and when the seat belt is fastened, similarly to the buzzer 6, the lamp 5 is also turned OFF.

[0034] As stated above, the plural alarm stages are provided, and the lamp is first lit, and as the degree of the danger increases, the alarm level is gradually raised, and accordingly, the uncomfortable feeling is not given to an operator while halting, and a necessary alarm can be certainly given.

[0035] Incidentally, the second stage S2 may be divided more minutely. For example, the second stage S2 may be divided into a first high alarm stage and a second high alarm stage. The transition occurs to the first high alarm stage when the vehicle speed exceeds the above vehicle speed in the first stage S1 and the lamp, together with buzzing, is driven to be turned on and off at a first period. The transition occurs to the second high alarm stage when a predetermined time (for example, 30 seconds) has passed from the first high alarm stage and in which the lamp, together with buzzing, is turned on and off at a second period shorter than the first period. That is, as the degree of the danger increases, the blinking period is made to rise, so that attention to the danger is evoked more certainly. Besides, the sound pressure of the second high alarm stage may be increased from the first high alarm stage. As stated above, by dividing the second stage S2 minutely, it becomes possible to more certainly give the alarm corresponding to the level of the danger.

[0036] In the above, although the stage transition in an upward direction from the first stage S1 to the third stage S3 has been described, there is actually a stage transition in a downward direction from the third stage S3 to the first stage S1. The respective stages including the stages mentioned above will be described with reference to Figs. 3 to 5.

[0037] Fig. 3 is the state transition diagram for explaining the state transition between the respective alarm stages of the embodiment of the present invention. Figs. 4 to 6 are state transition diagrams of the alarm operations in the first stage S1, the second stage S2 and the third stage S3, respectively. Incidentally, in Figs. 3 to 6, triggers for the state transitions are underlined, and the respective processing operations are enclosed in brackets.

[0038] As shown in Figs. 3 and 4, in the first stage S1 to which the transition occurs by turning ON the ignition switch 2, the transition occurs between the alarm ON state and the alarm OFF state based on whether the belt fastening or belt unfastening. That is, in the alarm ON state (at the time of belt unfastening), the lamp is ON and the buzzer is OFF. On the other hand, in the alarm OFF state (at the time of belt fastening), both the lamp and the buzzer become OFF. In this first stage S1, when the vehicle speed becomes 24 km/h or higher, the transition occurs to the next second stage S2.

[0039] As shown in Figs. 3 and 6, also in the second stage S2, belt fastening and belt unfastening are made triggers, and the transition occurs between the alarm ON state and the alarm OFF state. However, in the alarm ON state (at the time of the belt unfastening), states recited as an output ON state and an output OFF state are repeated at predetermined time intervals. That is, the output ON state continues for five seconds, and when the five seconds have passed, the transition occurs to the output OFF state. The output OFF state continues for one second, and when the one second has passed, the transition occurs to the output ON state. Further, in the output ON state, the lamp ON state and the lamp OFF state are repeated every 0.2 second. The lamp is ON in the lamp ON state, and the lamp is OFF in the lamp OFF state. On the other hand, in the alarm OFF state (at the time of belt fastening), similarly to the other stages, both the lamp and the buzzer are turned OFF. In this second stage S2, when the sum total of the buzzer ON becomes 90 seconds or more (irrespective of the alarm ON state and the alarm OFF state), the transition occurs to the next third stage S3, and when the vehicle speed becomes less than 24 km/h, only in the case of the belt fastening state, the transition occurs to the first stage S1. Accordingly, a pause in the buzzer sound expected to occur in the case of traveling at a speed in the vicinity of 24 km/h and in the seat belt unfastening state can be prevented from occurring.

[0040] As shown in Figs. 3 and 6, in the third stage S3, although the transition changes to the alarm OFF state by the belt fastening, when it changes to the belt unfastening in the alarm OFF state, the transition changes to the first stage S1. Incidentally, the lamp is ON and the buzzer is OFF in the alarm ON state (at the time of the belt unfastening), and both the lamp and the buzzer become OFF in the alarm OFF state (at the time of the belt fastening).

[0041] Incidentally, the above states are named for convenience in description of the operation of this embodiment, and do not limit the present invention. The time chart corresponding to the description using Figs. 3 to 6 is shown in Fig. 2.

[0042] As stated above, according to this embodiment, a phenomenon in which an alarm becomes intermittent and which is conceivable in the case of traveling at a speed in the vicinity of a vehicle speed as a reference for switching of the alarm stage, is prevented from occurring, and the uncomfortable feeling is not given to a driver. Of course, at the belt fastening needless time, such as the halting the vehicle, the alarm is not given by the buzzer 6, so that the uncomfortable feeling is not given to the operator. Besides, at the time of low speed driving, only the minimum alarm is given by the belt lamp 5, and as the driving speed and driving time increase and the degree of the danger rises, the belt lamp 5 is turned on and off, or the alarm by the buzzer 6 is given, so that the uncomfortable feeling is made minimum, and the necessary alarm is more effectively given. That is,

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according to this embodiment, the uncomfortable feeling is not given to the driver, and the alarm corresponding to a situation can be certainly given. As the result, this embodiment assists the manufacture of the vehicles for conforming with various vehicle evaluation standards.

[0043] Incidentally, with respect to the alarm method indicated by the first stage S1 and the second stage S2, various variations are conceivable on condition that an alarm level of a subsequent stage is raised from the first stage S1. Besides, the detection of belt unfastening may be applied to the co-driver seat and the rear seat in addition to the driver seat.

[0044] While the presently preferred embodiments of the present invention have been shown and described, it is to be understood that these disclosures are for the purpose of illustration and that various changes and modifications may be made without departing from the scope of the invention as set forth in the appended claims.

#### Claims

1. A method for reminding a seat belt fastening, comprising the steps of:

providing an audible alarm unit and a visible alarm unit;  
detecting at least either one of information of a vehicle speed, a traveling distance or a traveling time;  
setting a low alarm stage when only the visible alarm unit is actuated after an engine start and a high alarm stage when at least the audible alarm unit is actuated;  
actuating at least either one of the audible alarm unit or the visible alarm unit in accordance with the alarm stages;  
changing to the low alarm stage to the high alarm stage when a vehicle speed reaches a predetermined vehicle speed in the low alarm stage; and  
converting the high alarm stage to the low alarm stage only in a case that the seat belt is in a fastening state when the vehicle speed becomes less than the predetermined vehicle speed in the high alarm stage.

2. The method as set forth in claim 1, wherein both the audible alarm unit and the visible alarm unit are actuated in the high alarm stage.
3. The method as set forth in claim 2, wherein the audible alarm unit and the visible alarm unit are actuated synchronously in the high alarm stage.
4. The method as set forth in claim 2, wherein the vis-

ible alarm unit is actuated in the low alarm stage;

wherein the high alarm stage includes a first high alarm stage and a second high alarm stage;

wherein the low alarm stage changes to the first high alarm stage in the case of that the visible alarm unit is turned on and off at a first period when the vehicle speed exceeds the predetermined vehicle speed in the low alarm stage; and

wherein the first high alarm stage changes to the second high alarm stage in the case of that the visible alarm unit is turned on and off at a second period shorter than the first period when a predetermined time is passed.

5. The method as set forth in claim 1, wherein:

the visible alarm unit is a lamp; and  
the audible alarm unit is a buzzer.

6. A seat belt reminder apparatus, comprising:

an alarm information detector for detecting at least either one of a vehicle speed, a traveling distance or a time;  
a setting unit for setting a plurality of alarm stages on the basis of an alarm information detected by the alarm information detector; and  
an alarm unit having an audible alarm unit and a visible alarm unit for driving at least either one of the audible alarm unit or the visible alarm unit in accordance with the alarm stages;

wherein the setting unit sets a low alarm stage when only the visible alarm unit is actuated after an engine start and a high alarm stage when at least the audible alarm unit is actuated;

wherein the low alarm stage changes to the high alarm stage when the vehicle speed reaches the predetermined vehicle speed in the low alarm stage; and

wherein the high alarm stage changes to the low alarm stage only in the case that the seat belt is in the fastening state when the vehicle speed becomes less than the predetermined vehicle speed in the high alarm stage.

7. The seat belt reminder apparatus as set forth in claim 6, wherein:

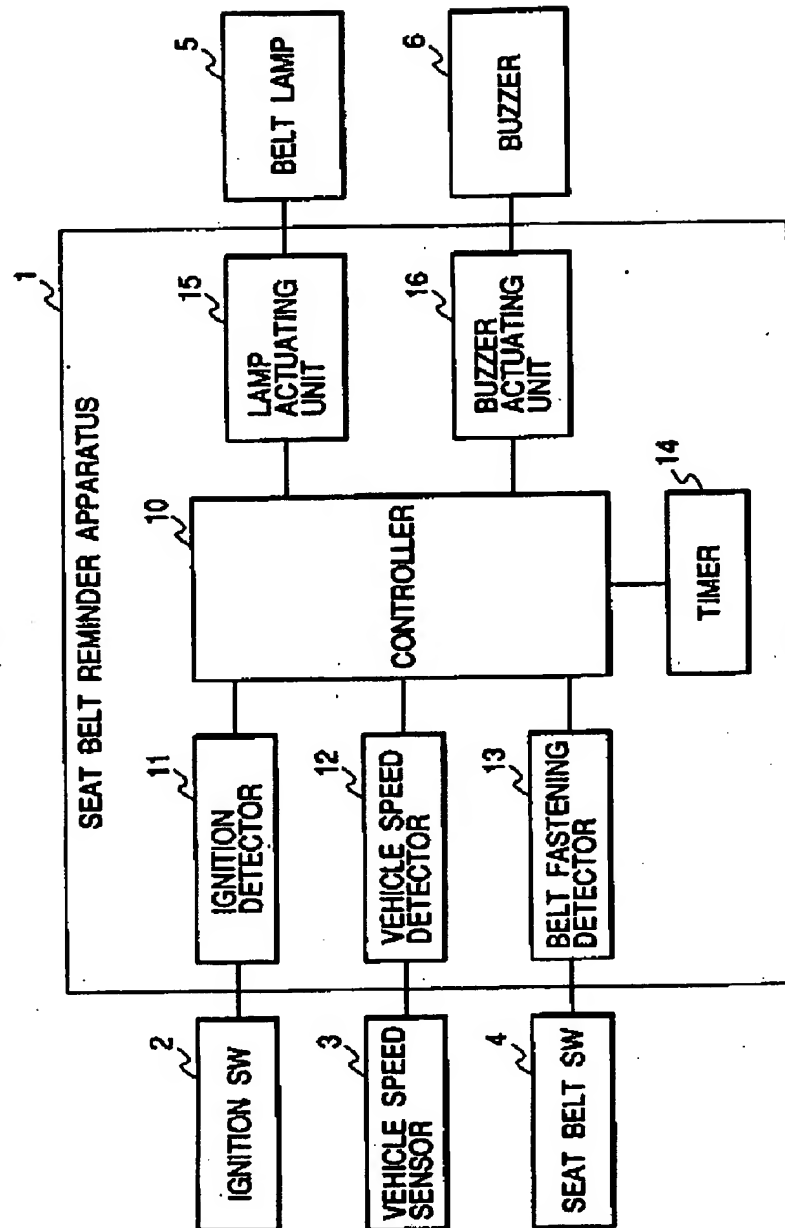
the audible alarm unit and the visible alarm unit are actuated synchronously in the high alarm stage.

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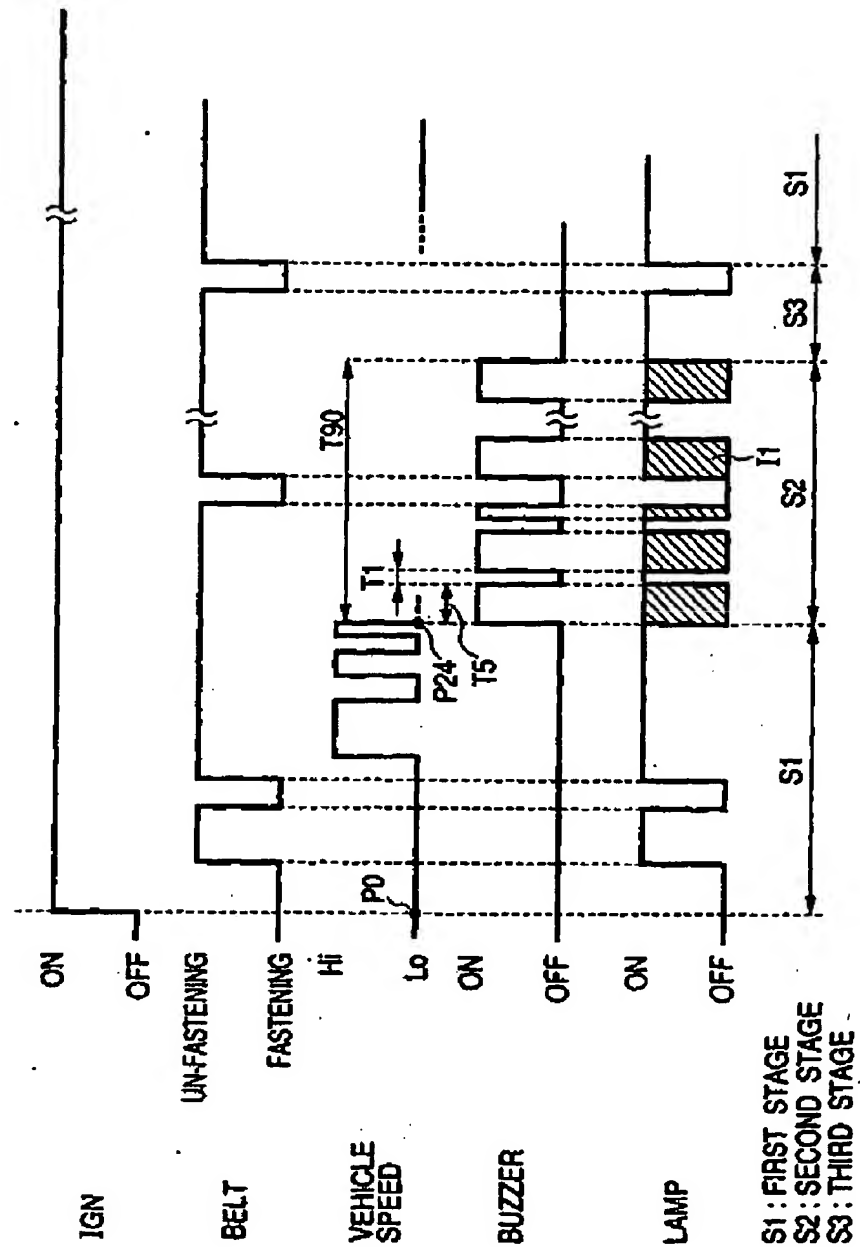
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FIG. 1



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FIG. 2

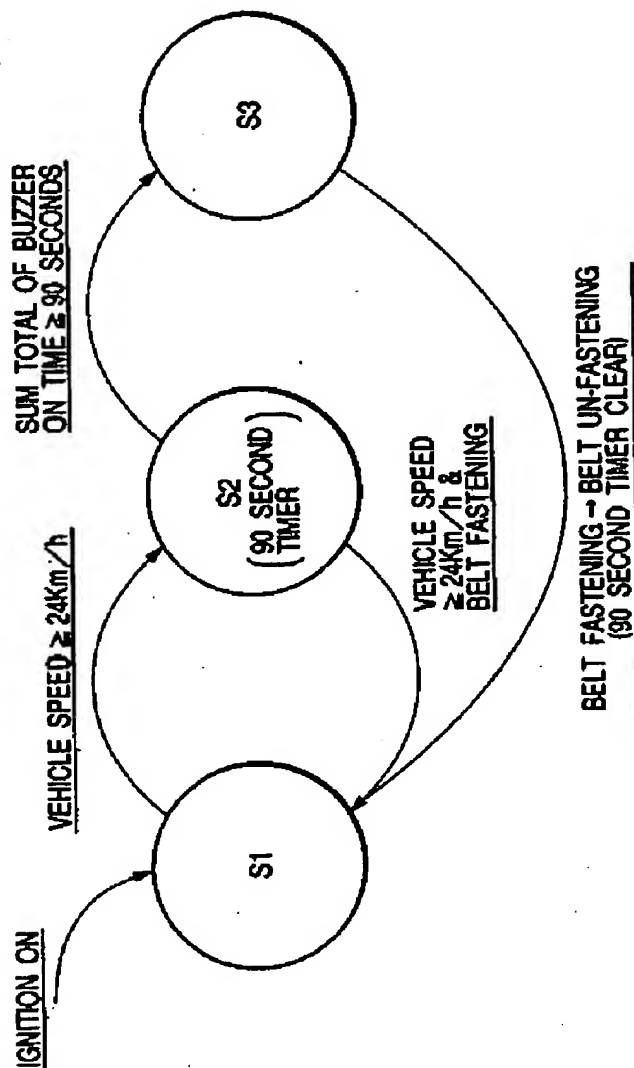


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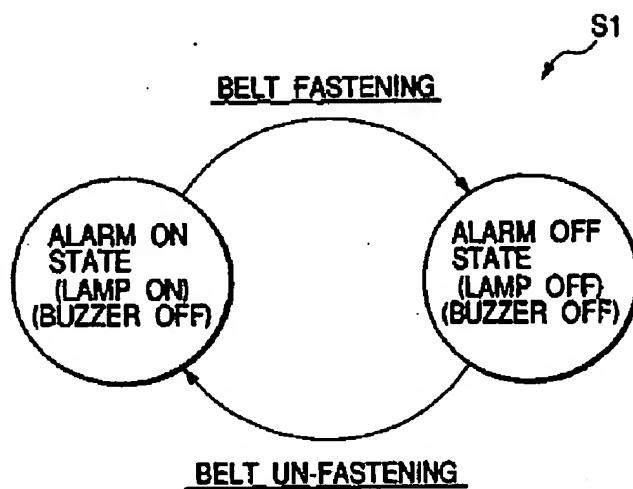


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FIG. 3

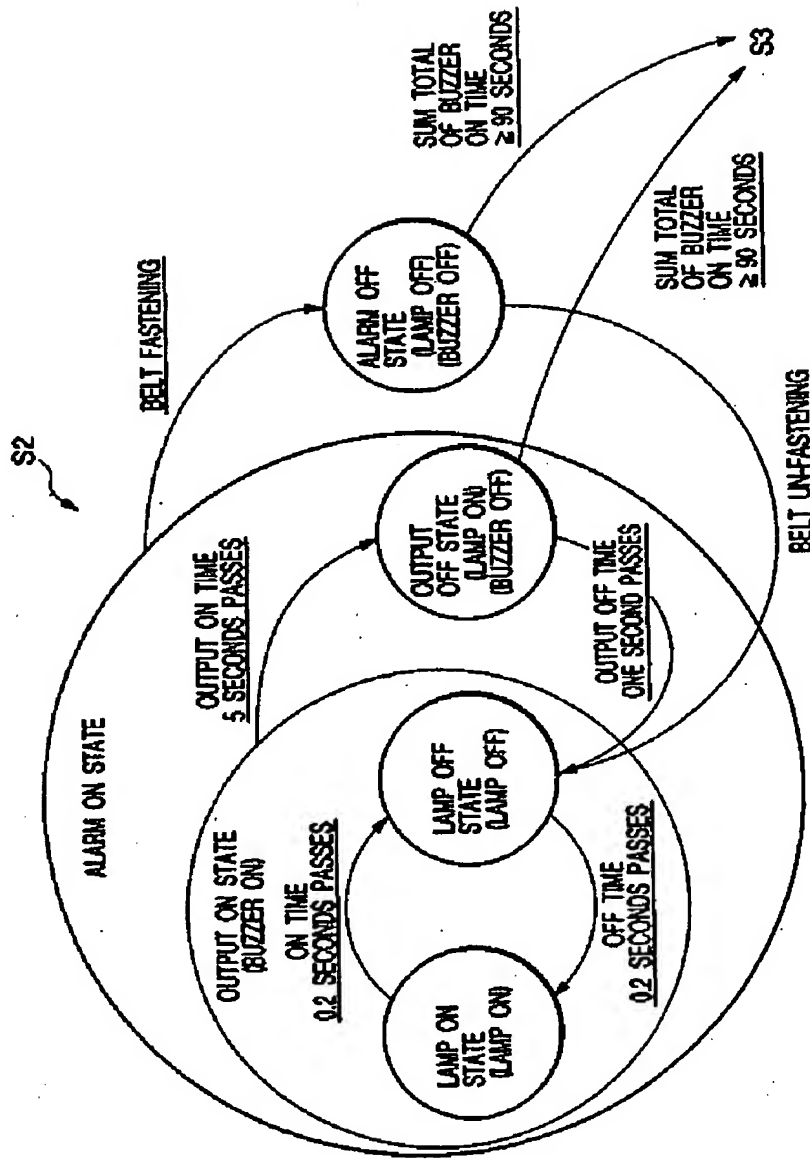


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**FIG. 4****BEST AVAILABLE COPY**

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FIG. 5



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FIG. 6

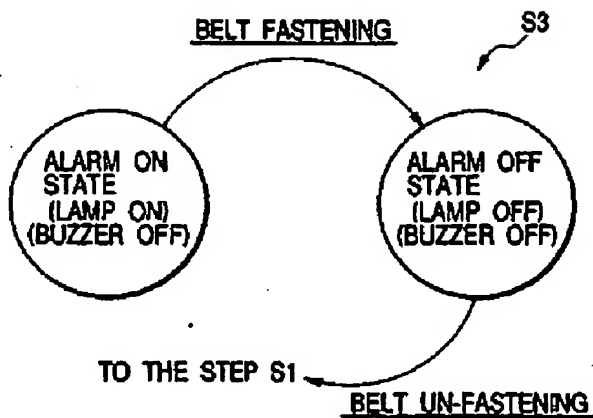
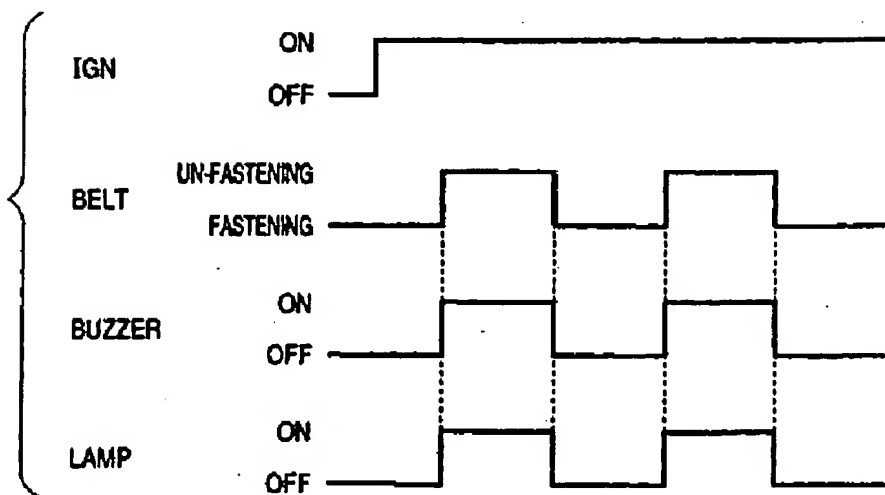


FIG. 7



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## EUROPEAN SEARCH REPORT

Application Number  
EP 03 25 3037

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (INCL.7)
A	US 6 278 358 B1 (KING DANIEL M ET AL) 21 August 2001 (2001-08-21) * column 2, paragraph 1 * * column 4, line 21-31 * * column 5, line 11-39; figure 2 * ---	1-7	B60R22/48
A	US 6 362 734 B1 (SCHONDORF STEVEN YELLIN ET AL) 26 March 2002 (2002-03-26) * column 5, line 5 - column 6, last paragraph * -----	1,6	
			TECHNICAL FIELDS SEARCHED (INCL.7)
			B60R
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 21 August 2003	Examiner Petersson, M
CATEGORY OF CITED DOCUMENTS Z : particularly relevant if prior art Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention S : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6278358	B1	21-08-2001	NONE
US 6362734	B1	26-03-2002	DE 10203139 A1
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